TDA8120B

MULTISTANDARD VIDEO AND SOUND IF SYSTEM

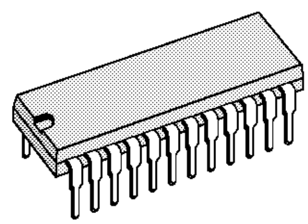
- GAIN CONTROLLED IF AMPLIFIER
- VIF OPERATING FREQUENCY UP TO 50MHz
- SYNCHRONOUS DETECTOR
- WHITE SPOT INVERTER
- VERY LOW DIFFERENTIAL ERROR
- VERY LOW PHASE ERROR
- INTERNAL AGC SWITCH (B/G - L)
- AGC TOP. SYNCH. FOR STANDARD B/G
- AGC TOP WHITE FOR STANDARD L
- QUASI SPLIT SOUND FOR STANDARD B/G
- SOUND DETECTOR FOR STANDARD L
- VIDEO MUTING FACILITY
- SEPARATED SOUND OUTPUT
- OPERATES WITHOUT EXTERNAL GATING PULSE

DESCRIPTION

The TDA8120B is a monolithic IC for TV video IF and Sound IF amplification and demodulation that can operate with all the TV standards.
The Video IF section can handle negative (B/G) or positive (L) modulated video signals by means of DC switching.

The Sound IF section acts as a Quasi Split Sound (QSS) subsystem in B/G transmission and allows a second Sound IF with high rejection of the video information.

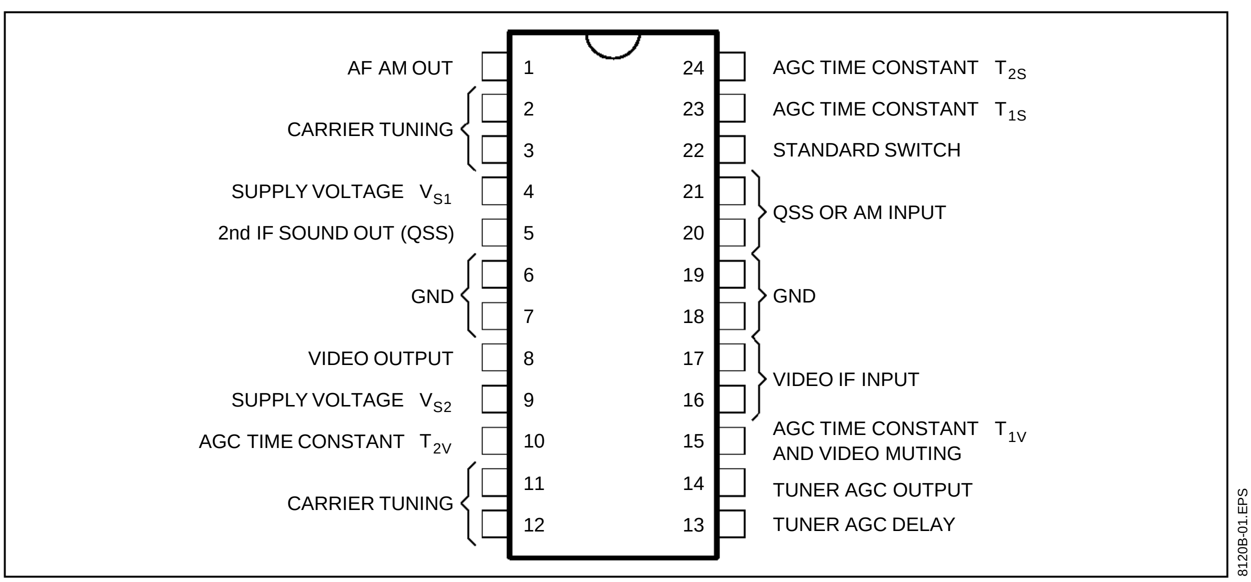
The DC switch can modify the Sound IF configuration to process AM modulated Sound signals (L).
The TDA8120B is assembled in a 24 pin dual in line power package.



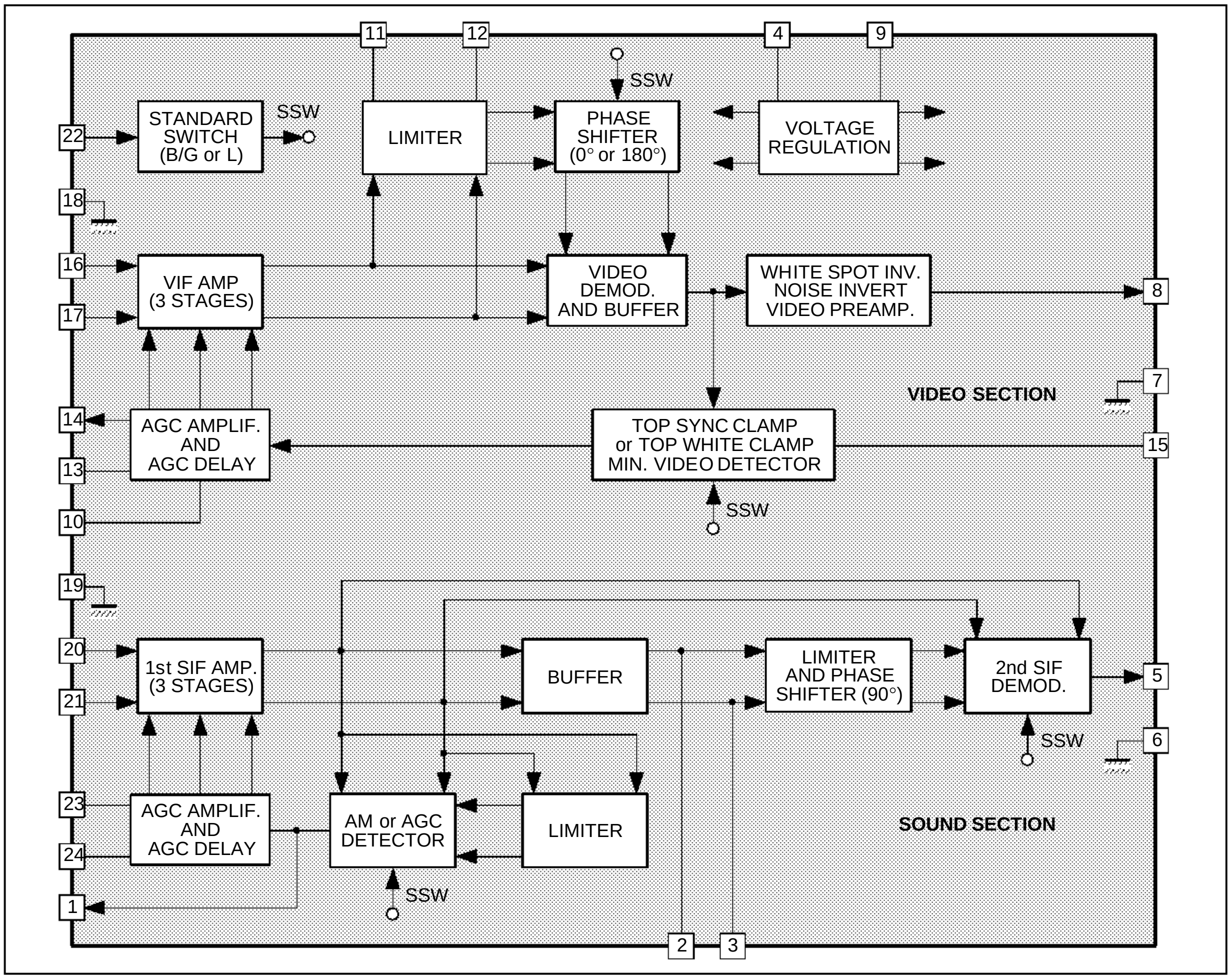
DIP24
(Plastic Package)

ORDER CODE : TDA8120B

PIN CONNECTIONS



BLOCK DIAGRAM



8120B-02.EPS

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_4, V_9	Supply Voltage V_s	15	V
I_8, I_5, I_1	Video Out, QSS_{out}, AF AM Out, DC Output Current	10	mA
I_{22}, I_{15}	Pin 22 and Pin 15 Input Current	1	mA
P_{tot}	Total Power Dissipation (T_{amb} = 70 °C)	2	W
T_{stg}, T_j	Storage and Junction Temperature	– 40 to 150	°C
V_{14}	Voltage at Pin 14	V_s	

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THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th\ j\text{–}amb}$	Thermal Resistance Max	40	°C/W

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ELECTRICAL CHARACTERISTICS (V_S = 12V, T_{amb} = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VIDEO IF SECTION V_I = 10 mV_{RMS} (black field), F_O = 38.9MHz ; unless otherwise specified						
V_s	Supply Voltage (Pins 4 and 9)		10.8	12	13.2	V
I_s	Supply Current	V_I= 0		120		mA
V_{8H}	Top White Level	V_I = 0, R_L = 1.5kΩ	5.5	6	6.5	V
V_{8L}	Top Synchronous Level		2.7	3	3.3	V
V_8	Video Output B/G	Modulation Depth, D = 90%, R_L = 1.5kΩ	2.2	3	3.4	V_{pp}
V_8	Video Output L	R_L = 1.5kΩ, M = 100%	2.2	3	3.4	V_{pp}
ΔV_8	Video Output Variation between Standards B/G and L	M = 100%		± 2		%
– I_8	Output Current	R_L = 1.5kΩ		4		mA
I_8	Input Current		2			mA
I_{14}	Tuner AGC Current Capability			4.5		mA
S/N	Signal to Noise Ratio	B = 5MHz, D = 90%	50			dB
ΔV_I	AGC Range	ΔV_8 = 1dB, D = 90%	60			dB
B	Bandwidth	ΔV_8 = – 3dB, D = 90%	7			MHz
V_{16-17}	Input Sensitivity for Full Output Signal	D = 90%		50		µV
V_8	Carrier Leakages	F_o = 38.9MHz F_o = 77.8MHz		20 50		mV mV
dG	Differential Gain	Subcarrier Modulated Staircase Video Signal, D = 90%			10	%
dϕ	Differential Phase	Subcarrier Modulated Staircase Video Signal, D = 90%			10	degree
d_{IM}	Intermodulation Product 1.07MHz	Video Carrier Relative Level = 0dB Chroma Subcarrier Relative Level = – 3.2dB Sound Carrier Relative Level = – 20dB		50		dB
R_i	Input Resistance (between Pins 16 and pin 17)			1.5		kΩ
C_i	Input Capacitance (between Pins 16 and pin 17)			2		pF
QUASI SPLIT SOUND CHANNEL OR FRENCH SOUND CHANNEL (see notes 1 and 2)						
V_{20-21}	Input Sensitivity for Full Output Signal (between Pins 20 and 21)	R Channel Missing		50		µV
ΔV_i	AGC Range	ΔV_5 = 1dB, R Channel Missing	60			dB
V_5	Output Voltage Standard B/G	R_L = 600Ω, AC Coupled, F_O = 5.5MHz		100		mV_{RMS}
I_5	Output Current			2.5		mA
Z_5	Small Signal Output Impedance (QSS)	F_O = 5.5MHz or F_O = 5.74MHz			50	kΩ
R_i	Input Resistance (between Pin 21 and Pin 20)			1.5		kΩ
C_i	Input Capacitance (between Pin 21 and Pin 20)			2		pF
S/N	Noise Ratio QSS (after SIF limitation and FM demodulation) F_O = 5.50MHz F_O = 5.74MHz	Channel R or Channel L Switched off F_m = 1kHz, Δf = ± 30kHz Carrier Modulated with Syncs. Pulses Only. CCIR 468-2 Recommendant	 60 58			dB
V_1	Output Voltage Standard L		0.58	0.7	1	V_{RMS}
I_1	Output Current			2.5		mA
Z_1	AF Output Impedance (L)				50	Ω
S/N	Noise Ratio AM Standard L	B_N = 20kHz	46			dB

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ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
QUASI SPLIT SOUND CHANNEL OR FRENCH SOUND CHANNEL (see notes 1 and 2)						
d	Distorsion				2	%
V_{22}	B/G Operation L Operation		2 0		5 0.8	V V
V_{15}	Video Muting		8		V_S	V

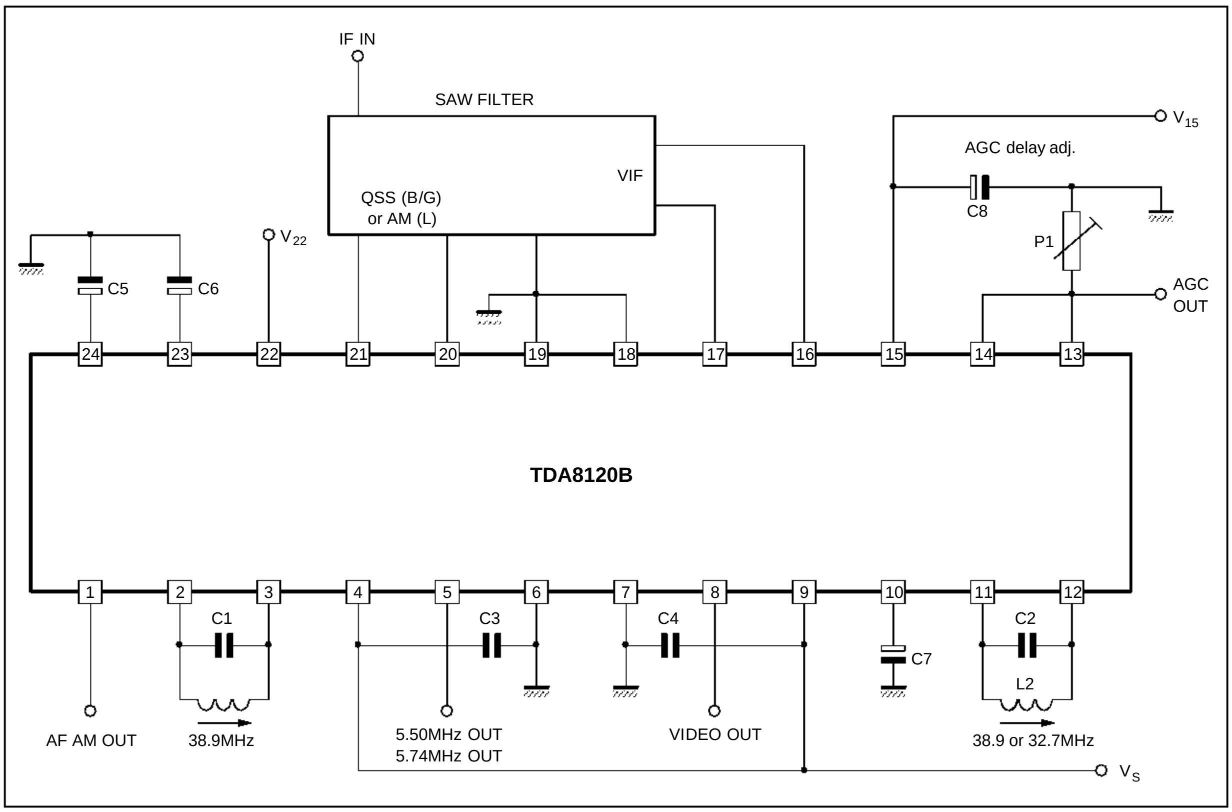
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Notes : 1. QUASI SPLIT SOUND CHANNEL

Δf = 0 | Video carrier relative level = 0dB f = 38.9MHz
Sound carrier relative level = 13dB (mono or L) f = 33.4MHz
Sound carrier relative level = -20dB (R) f = 33.16MHz
V_I = 10mV Video carrier modulated with syncs ; V_{22} = 2V, unless otherwise specified.

2. FRENCH SOUND CHANNEL
V_I = 10mV (Carrier level) ; f_o = 39.2MHz ; F_m = 1kHz ; m = 80% ; V_{22} = 0.8V, unless otherwise specified.

TEST CIRCUIT



8120B-03.EPS

CIRCUIT OPERATION

The TDA8120B (see block diagram) consists of a video section and a sound section. The integration of both sections on the same chip requires a high isolation at IF frequencies. This is achieved by physically separating the two sections, with separate power supplies and ground pins. In addition, special care has been taken in the choice of pad positions for the IF inputs and sound/video outputs.

The video section consists of three AC-coupled IF stages with more than 60dB AGC range, flat amplitude/frequency response from 10 to 85MHz and linearized phase slope from 30 to 50MHz. Video carrier regeneration is performed by a tuned limiter. The carrier is then applied to the video demodulator through a special circuit which switches the carrier phase from 0 to 180° so that the video polarity can be maintained constant when the standard switches from B/G to L. A noise inverter and a white spot inverter are included to eliminate ultra-black and white pulses.

A top sync or a top white clamping circuit and a minimum DC video component detector are implemented by two double comparators the characteristics of which may be controlled by an external control input to adapt to the modulation type for each standard. The voltage at the output of the two comparators is memorized by an external capacitor and used to drive the AGC network, which allows an input regulation of the video carrier from less than 100µV to 100mV. A delayed control storage with current output for the turner AGC completes the video section.

The sound section consists of three IF stages with the same characteristics as the video IF stages and an identical network to control and set the gains of the three IF amplifiers. The output of the third IF stage feeds the AM/AGC detector and the QSS section.

The AM/AGC detector consists of a wideband limiter for AM sound regeneration or video carrier regeneration used to feed the synchronous multiplier and consequently to obtain the AM demodulated audio signal. In addition, a DC voltage proportional to the peak-to-peak value of the video carrier is produced. Two comparators complete the sound AGC loop.

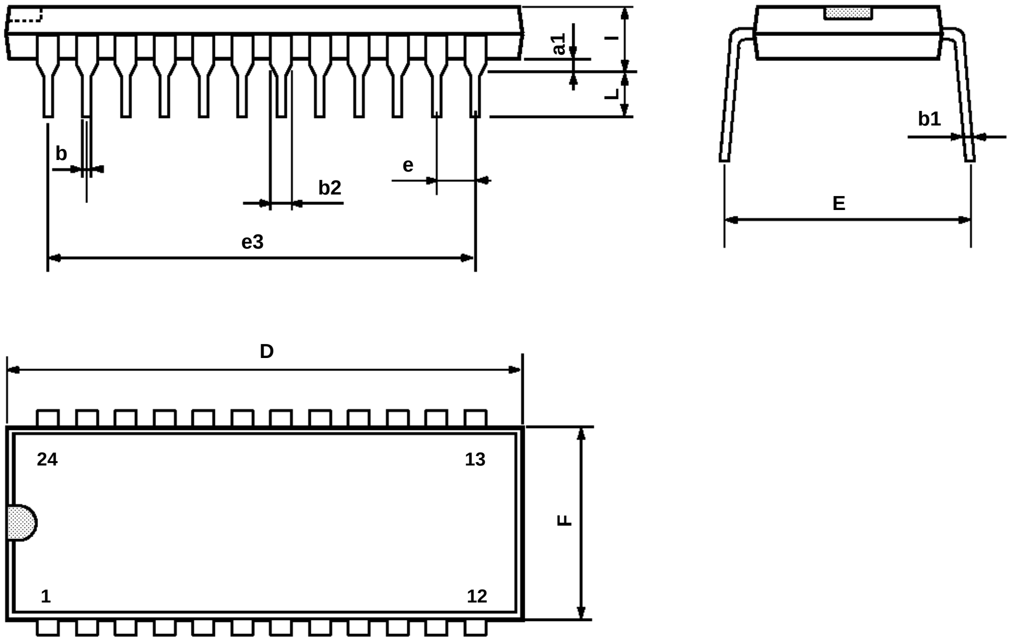
The subsequent QSS section consists of a reference amplifier tuned to the video IF which buffers a wideband limiter to reject completely the video AM information without introducing incidental phase modulation (IPM).

Following the limiter there are a 90° phase shifter and a linear-to-logarithmic converter which drives a linear multiplier as a demodulator for the intercarrier 2nd sound IF. This quadrature multiplier rejects all video components transmitted in DSB that is low frequency components of the video signal.

In addition to the sound and video sections, the TDA8120B includes a block for standard switching (B/G or L) controlled by a TTL-compatible input.

PACKAGE MECHANICAL DATA

24 PINS - PLASTIC DIP



PM-DIP24.EPS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
a1		0.63			0.025	
b		0.45			0.018	
b1	0.23		0.31	0.009		0.012
b2		1.27			0.050	
D			32.2			1.268
E	15.2		16.68	0.598		0.657
e		2.54			0.100	
e3		27.94			1.100	
F			14.1			0.555
i		4.445			0.175	
L		3.3			0.130	

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